REMARKS

INTRODUCTION

Claims 1-28 are pending and under consideration.

Claims 1, 9, 10, 13, 22, and 23 have been amended.

Claims 1-8 and 11-28 have been rejected.

Claims 9 and 10 have been objected to.

No new matter is being presented, and approval and entry are respectfully requested.

ENTRY OF AMENDMENT UNDER 37 C.F.R. §1.116

Applicant requests entry of this Rule 116 Response because:

(a) it is believed that the amendment of the claims puts this application into condition for allowance as suggested by the Examiner;

(b) the amendments were not earlier presented because the Applicant believed in good faith that the cited prior art did not disclose the present invention as previously claimed;

(c) the amendments do not significantly alter the scope of the claims and place the application at least into a better form for purposes of appeal. No new features or new issues are being raised.

The Manual of Patent Examining Procedures sets forth in Section 714.12 that "any amendment that would place the case either in condition for allowance or in better form for appeal may be entered." Moreover, Section 714.13 sets forth that "the Proposed Amendment should be given sufficient consideration to determine whether the claims are in condition for allowance and/or whether the issues on appeal are simplified." The Manual of Patent Examining Procedures further articulates that the reason for any non-entry should be explained expressly in the Advisory Action.

REJECTIONS UNDER 35 USC § 112, FIRST PARAGRAPH

CLAIMS 7 AND 11

The rejection states that the specification does not define workability or explain how it is evaluated. The Merriam-Webster Dictionary states that "workable" is used to mean: capable of being worked; practicable, feasible. As used in the present invention, workability is used to indicate both discrete workability or feasibility (yes or no), and degree of workability or feasibility (e.g. coefficient of workability).

Annotated copies of Figures 11 and 12, included herewith, indicate that discrete feasibility or workability is determined at B9 and B29. Stage B9 determines whether it is feasible or workable to position or maneuver the working means (e.g. tool model) into position to contact or interfere with the part to be worked. If the working means has a minimum working range (B22), then stage B29 determines whether the working means model has been operated (moved, B24) up to the minimum range.

The present invention can also relate to a non-discrete degree of workability or feasibility ("the simulation calculation... calculates a working *range amount over which working can be performed*"). Stages B24, B25, and B26 work together to move the working means over its range until it is stopped by interference (B25), or until it reaches the ideal range for the working means (B26), at which point it has reached the "working range amount" (i.e. range of movement). Stage B36 can calculate a degree or coefficient of non-discrete workability or feasibility based at least on the working range amount (i.e. the maximum range for the working means model in the particular context and part being simulated), or based also on the minimum range of the working means model. Given a working range and a minimum range, an ordinary programmer would know that the coefficient could be the working range itself, or it could be derived using any number of possible calculations, such as a simple ratio calculation (actual range of movement divided by minimum range of movement), a linear or non-linear weighted ratio, etc. , and ").

It is respectfully submitted that in view of at least the above, the specification explains how workability is evaluated (discrete workability of reaching the part, and non-discrete range of movement at the part), based on the simulation and based on the workability coefficient. Withdrawal of the rejection of claims 7 and 11 is respectfully requested.

CLAIMS 24-28

The Summary of the present invention mentions that "there is provided a simulation apparatus for simulating, based on design information of a **design model** designed in a virtual three-dimensional space while one or more standard **part models** standardized in advance based on a specification model are arranged in the design model", and "**working means model** related to one or more standard part models for working the standard part models".

Claims 24-28 recite a "main model". By itself, a "main model" could have many meanings. Claim 24, for example, recites "determining whether the arranged working model can work the component model, by automatically comparing the arrangement information and the working requirements of the working model to the main model". The "main model" corresponds to the "design model" of the specification. The "workable component model" corresponds to a "standard part model", and the "working means model" corresponds to the "working model".

The Examiner has expressed dissatisfaction with the use of "means" to describe elements not related to § 116, sixth paragraph (e.g "working means"). Relying on § 2175.03(e) of the MPEP, Applicant has included claims intended to address the Examiner's concern (§ 2175.03(e): "[t]here is no requirement that the words in the claim must match those used in the specification disclosure. Applicants are given a great deal of latitude in how they choose to define their invention ..."). The Examiner has indicated an understanding that the terms in question relate to terms in the specification. There is no requirement that claims must relate to or recite specific language in the specification. Withdrawal of the rejection is respectfully requested.

REJECTIONS UNDER 35 USC § 112, SECOND PARAGRAPH

In the Office Action, claims 7, 11, and 23 were rejected under 35 U.S.C. § 112, second paragraph, for the reasons set forth therein.

CLAIM 23

Claim 23 has been corrected.

CLAIMS 7 AND 11

See the discussion above relating to the rejection under § 112, first paragraph. One of

ordinary skill in the art would readily understand that "workability" can relate to whether the working means can be "worked" into the position of the part model, and can also relate to whether and to what extent the working means can operate through a range of movement.

CLAIMS 24-28

The rejection itself acknowledges that the terms in question have a "relationship to the working means model and standard parts model". Therefore, it is respectfully submitted that no further explanation of the relationship should be required.

Withdrawal of the rejection is respectfully requested.

REJECTIONS UNDER 35 USC § 103

In the Office Action, claims 1-5, 8, 12-18, and 21-23 were rejected under 35 U.S.C. § 103 as obvious over Goto in view of Siddique. Claims 6, 19, and 20 were rejected in further view of Hirata. These rejections are traversed and reconsideration is requested.

The rejection is based on a misinterpretation of the presently claimed invention. An aspect of the presently claimed invention is to simulate the working of a working means model (e.g. tool or hand) to be used for the one or more standard part models arranged in the design model. Claims 1, 13, and 22 have been amended to clarify this aspect of the presently claimed invention. Withdrawal of the rejection is respectfully requested.

DEPENDENT CLAIMS

The dependent claims are deemed patentable due at least to their dependence from allowable independent claims. These claims are also patentable due to their recitation of independently distinguishing features. For example, claim 2 recites "said working means model information extraction section refers to said working means model information storage section based on the attribute information", of the part, "to extract the information regarding the working means model". Siddique discusses extracting a tool or working means model interactively, not based on the attribute information of the part. This feature is not taught or suggested by the prior art. Withdrawal of the rejection of the dependent claims is respectfully requested.

ALLOWABLE CLAIMS 9 AND 10

The Office Action indicated that objected-to claims 9 and 10 would be allowed if drafted in independent form. These claims have been so amended. Withdrawal of the objection is respectfully requested.

CLAIMS 24-28: INCOMPLETE EXAMINATION, AND IMPROPER NEW REJECTION

The Office Action did not examine the patentability of claims 24-28 with respect to the prior art. These claims should have been examined despite their rejection under § 112.

Claims 24-28 were rejected under § 112, first paragraph. Generally, even if claims are rejected under § 112, first paragraph, their patentability with respect to the prior art *must* be determined by the Examiner (see MPEP § 2163, part III, stating "Regardless of the outcome of that [§ 112, first paragraph] determination, Office personnel *must complete the patentability determination under all the relevant statutory provisions* of title 35 of the U.S. Code.").

Claims 24-28 were rejected as indefinite under § 112, second paragraph. When the degree of uncertainty of the claims is not great, the Examiner is to *chose an interpretation and analyze the claims under the prior art based on that interpretation* (MPEP § 2173.06). There is no great uncertainty about the meaning of claims 24-28, considering that:

(1) the Examiner has acknowledged the relationship between the elements of claims 24-28 and the working means model, part model, and design model;

(2) claims 24-28 were previously amended only to replace "manipulate" with "work" - words with nearly identical meaning (From the Marked-up changes in last amendment: "a [manipulatable] workable component model", and "a [manipulator] working model");

(3) "main model" was previously recited without rejection, was not amended, and is now rejected as indefinite; and

(4) claims 24-28 were previously definite enough to be rejected under § 102.

Claims 7 and 11 were similarly not examined with respect to the prior art. Applicant respectfully requests a new Office Action that either allows or fully examines claims 7, 11, and 24-28.

WITHDRAWAL OF FINALITY REQUESTED

In view of points (2)-(4) above, it is respectfully submitted that the § 112, second paragraph rejection of claims 24-28 is a new ground for rejection not necessitated by their previous amendment. Applicant has not been given an opportunity to respond to a rejection that they did not necessitate, and therefore requests a new non-Final Office Action

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: 24 Feb 2003

By: James Strom

James T. Strom
Registration No. 48,702

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please AMEND the claims in accordance with the following:

1. (TWICE AMENDED) A simulation apparatus for simulating, based on design information of a design model designed in a virtual three-dimensional space while one or more standard part models standardized in advance based on a specification model are arranged in the design model, working of a working means model to be used for the one or more standard part models arranged in the design model, comprising:

a working means model information storage section for storing working means model information which indicates details of [a] the working means model to be used in working on the one or more standard part models, said working means model information being linked with standard part model information which indicates details of the one or more standard part models;

a working means model information extraction section for automatically referring, based on information regarding the standard part models arranged in a design model, to said working means model information storage section to extract information regarding a working means model to be used to work the standard part models arranged in the design model; and

a working simulation execution section for executing a simulation of the working for the standard part models with the working means model based on design information of the design model and the information regarding the working means model extracted by said working means model information extraction section.

2. (UNAMENDED) A simulation apparatus as claimed in claim 1, wherein the information regarding the standard part models arranged in the design model include attribute information of the working means model related to the standard part models, and said working means model information extraction section refers to said working means model information storage section based on the attribute information to extract the information regarding the working means model.

3. (UNAMENDED) A simulation apparatus as claimed in claim 1, wherein said

working means model information storage section stores information of one or more tool models which are models of actual tools and/or a hand model which is a model of a hand of a worker as the information regarding the working means model.

4. (UNAMENDED) A simulation apparatus as claimed in claim 1, wherein the information regarding the working means model stored in said working means model information storage section includes reference position information of the working means model when the working means model works the standard part models while the design information of the design model includes reference position information of the standard part models when the working means model works the standard part models, and said working simulation execution section performs a simulation of a relationship in position/posture of the working means model to the standard part models based on the reference position information of the working means model and the standard part models.

5. (UNAMENDED) A simulation apparatus as claimed in claim 1, further comprising an interference checking section for checking interference of the working means model while said working simulation execution section executes a simulation of the working for the standard part models with the working means model.

6. (UNAMENDED) A simulation apparatus as claimed in claim 5, wherein said interference checking section checks interference of the working means model including a route along which the working means model arrives at one of the standard part models when the standard part model arranged in the design model is worked using the working means model.

7. (ONCE AMENDED) A simulation apparatus as claimed in claim 2, further comprising a workability evaluation coefficient storage section for storing, for the working means model included in the same attribute, a workability evaluation coefficient which is referred to for evaluating a workability of the working means model, and a workability evaluation section for evaluating the workability based on a result of execution of the working simulation by said working simulation execution section and also based on the workability evaluation coefficient stored in said workability evaluation coefficient storage section.

8. (UNAMENDED) A simulation apparatus as claimed in claim 1, wherein said

working means model information storage section stores information regarding a working condition necessary for working for the working means model as information regarding the working means model, and said working simulation execution section executes a working simulation based on the information regarding the working condition of the corresponding working means model stored in said working means model information storage section.

9. (ONCE AMENDED) [A simulation apparatus as claimed in claim 8] A simulation apparatus for simulating, based on design information of a design model designed in a virtual three-dimensional space while one or more standard part models standardized in advance based on a specification model are arranged in the design model, working for the standard part models arranged in the design model, comprising:

a working means model information storage section for storing working means model information which indicates details of a working means model to be used in working on the one or more standard part models, said working means model information being linked with standard part model information which indicates details of the one or more standard part models;

a working means model information extraction section for automatically referring, based on information regarding the standard part models arranged in a design model, to said working means model information storage section to extract information regarding a working means model to be used to work the standard part models arranged in the design model; and

a working simulation execution section for executing a simulation of the working for the standard part models with the working means model based on design information of the design model and the information regarding the working means model extracted by said working means model information extraction section, wherein

said working means model information storage section stores information regarding a working condition necessary for working for the working means model as information regarding the working means model, and said working simulation execution section executes a working simulation based on the information regarding the working condition of the corresponding working means model stored in said working means model information storage section, wherein

said working means model information storage section stores information regarding working spaces necessary for working with the working means model as the information regarding the working conditions of the individual working means model.

10. (ONCE AMENDED) [A simulation apparatus as claimed in claim 4] A simulation

apparatus for simulating, based on design information of a design model designed in a virtual three-dimensional space while one or more standard part models standardized in advance based on a specification model are arranged in the design model, working for the standard part models arranged in the design model, comprising:

a working means model information storage section for storing working means model information which indicates details of a working means model to be used in working on the one or more standard part models, said working means model information being linked with standard part model information which indicates details of the one or more standard part models;

a working means model information extraction section for automatically referring, based on information regarding the standard part models arranged in a design model, to said working means model information storage section to extract information regarding a working means model to be used to work the standard part models arranged in the design model; and

a working simulation execution section for executing a simulation of the working for the standard part models with the working means model based on design information of the design model and the information regarding the working means model extracted by said working means model information extraction section, wherein

the information regarding the working means model stored in said working means model information storage section includes reference position information of the working means model when the working means model works the standard part models while the design information of the design model includes reference position information of the standard part models when the working means model works the standard part models, and said working simulation execution section performs a simulation of a relationship in position/posture of the working means model to the standard part models based on the reference position information of the working means model and the standard part models, wherein

said working means model information storage section stores information of a plurality of reference positions for any working means model which allows operation thereof in a plurality of different methods, and said working simulation execution section executes a working simulation according to the plurality of operation methods.

11. (ONCE AMENDED) A simulation apparatus as claimed in claim 7, wherein said working means model information storage section stores information of a plurality of reference positions for any working means model which allows operation thereof in a plurality of different methods and said working simulation execution section executes a working simulation according

to the plurality of operation methods while said workability evaluation coefficient storage section stores a workability evaluation coefficient which is referred to for evaluating a workability for each of the operation methods of the working means model, and said workability evaluation section evaluates the workability of the working means model for the each of the working methods based on a result of execution of the working simulation according to the working method and also based on the workability evaluation coefficient stored for the operation method of the working means model in said workability evaluation coefficient storage section.

12. (UNAMENDED) A simulation apparatus as claimed in claim 1, wherein at least one of a fastening part model, an adjustment part model and a connector part model is used for the standard part models.

13. (TWICE AMENDED) A simulation method for simulating, based on data regarding a design model displayed in a virtual three-dimensional space and designed while one or more standard part models standardized in advance based on a specification model are arranged in the design model, workability according to a working means model used to work the standard part models arranged in the design model, comprising:

providing working means model information, which indicates details of a working means model to be used in working on the one or more standard part models, and standard part model information, which indicates details of the one or more standard part models, said working means model information being linked with said standard part model information;

automatically acquiring the working means model, which is to be used in working on the individual standard part model, based on said working means model information linked with said standard part model information that indicates the details of the last-named individual standard part model;

executing a simulation of working to be performed for the standard part models using the acquired working means model [information]; and

displaying a process of the execution of the simulation in a virtual three-dimensional space.

14. (UNAMENDED) A simulation method as claimed in claim 13, wherein, as the simulation of the working to be performed for the standard part models, a simulation of at least one kind of working from among assembling working, disassembling working, adjustment

working and maintenance working for the standard part models is performed.

15. (UNAMENDED) A simulation method as claimed in claim 13, wherein, where a tool is used to work the standard part models, the tool and a hand of a worker who uses the tool are used as the working means model to perform the simulation of the working.

16. (UNAMENDED) A simulation method as claimed in claim 13, wherein, where the standard part models are to be worked by a hand of a worker itself, the hand of the worker is used as the working means model to perform the simulation of the working.

17. (UNAMENDED) A simulation method as claimed in claim 15, wherein, when the process of execution of the simulation of the working is displayed in the virtual three-dimensional space, the working means model is displayed in a shape suitable for an object of use in the virtual three-dimensional space.

18. (UNAMENDED) A simulation method as claimed in claim 16, wherein, when the process of execution of the simulation of the working is displayed in the virtual three-dimensional space, the working means model is displayed in a shape suitable for an object of use in the virtual three-dimensional space.

19. (UNAMENDED) A simulation method as claimed in claim 13, wherein a process through which the working means model arrives at one of the standard part models which provides a subject position and a manner of working performed based on a condition defined in advance for the working means model are displayed as the process of execution of the simulation of the working.

20. (UNAMENDED) A simulation method as claimed in claim 19, wherein, after the working performed based on the condition defined in advance for the working means model is completed, a process through which the working means model is spaced away from the subject position based on a condition defined in advance for the standard part models is displayed, and after the working means model is spaced by a predefined distance away from the subject position, the display of the working means model or the working means model and the standard part models is erased.

21. (UNAMENDED) A simulation method as claimed in claim 13, wherein, when interference occurs with the working means model in a process of execution of the working to be performed for the standard part models with the working means model, an occurrence condition of the interference is displayed.

22. (TWICE AMENDED) A computer-readable recording medium having a simulation program recorded thereon for causing, in order to cause a computer to execute, based on design information of a design model designed in a virtual three-dimensional space while one or more standardized standard part models are arranged in the design model, a simulation of working [with] of a working means model used to work for the standard part models arranged in the design model, the computer to implement:

a function of providing working means model information, which indicates details of a working means model to be used in working on the one or more standard part models, and standard part model information, which indicates details of the one or more standard part models, said working means model information being linked with said standard part model information;

a function of automatically acquiring said working means model information, which is to be linked with the working means model to be used in working on the individual standard part models used upon designing of a design model;

a function of executing a simulation of working to be performed for the standard part models based on the acquired information of the working means model; and

a function of displaying a process of the execution of the simulation in a virtual three-dimensional space.

23. (TWICE AMENDED) A designing supporting apparatus, comprising:

a standard part model information storage section for storing standard part model information regarding one or more standard part models standardized in advance based on a predetermined specification model; and

a designing supporting section for arranging one or more standard part models to perform supporting for designing a subject in a virtual three-dimensional space;

said designing supporting [means] section including an attribute information extraction section for referring to said standard part model information storage section to automatically

extract attribute information of a working means model to be used to work the standard part models arranged in the subject designed in the virtual three-dimensional space, and a design data outputting section for outputting data regarding the subject designed in the virtual three-dimensional space and data regarding the attribute information extracted by said attribute information extraction section as design data, said attribute information including working means model information, which indicates details of a working means model to be used in working on the one or more standard part models and which is linked with said standard part model information.

24. (ONCE AMENDED) An apparatus for simulating work upon a model, comprising:

a main model comprised of a workable component model;

a working model, separate from the main model, capable of working the workable component model in a virtual three-dimensional space according to working requirements of the working model;

arrangement information describing an arrangement of the working model when it is working the component model; and

a processing unit automatically determining whether the arranged working model can work the component model, by automatically comparing the arrangement information and the working requirements of the working model to the main model.

25. (ONCE AMENDED) The apparatus according to claim 24, wherein the processing unit also determines whether the working model can be moved in the virtual three-dimensional space to its arrangement without interference between the moving working model and the main model.

26. (ONCE AMENDED) The apparatus according to claim 25, wherein orientation information is associated with the component model, and determining whether the working model can be moved in the virtual three-dimensional space to its arrangement further comprises determining whether the working model can approach the component model according to the orientation information, without interference from the main model.

27. (ONCE AMENDED) A method for simulating, comprising:

arranging a working model into a working arrangement, according to an arrangement of

a component model of a main model; and

automatically determining whether the working model, as arranged in its working arrangement, can work upon, in virtual three-dimensional space, the component model, by using the main model and working requirements of the working model to automatically simulate the working model working upon the component model.

28. (ONCE AMENDED) The method according to claim 27, further comprising determining whether said arranging can be performed without interference between the main model and the working model.

FIG. 11

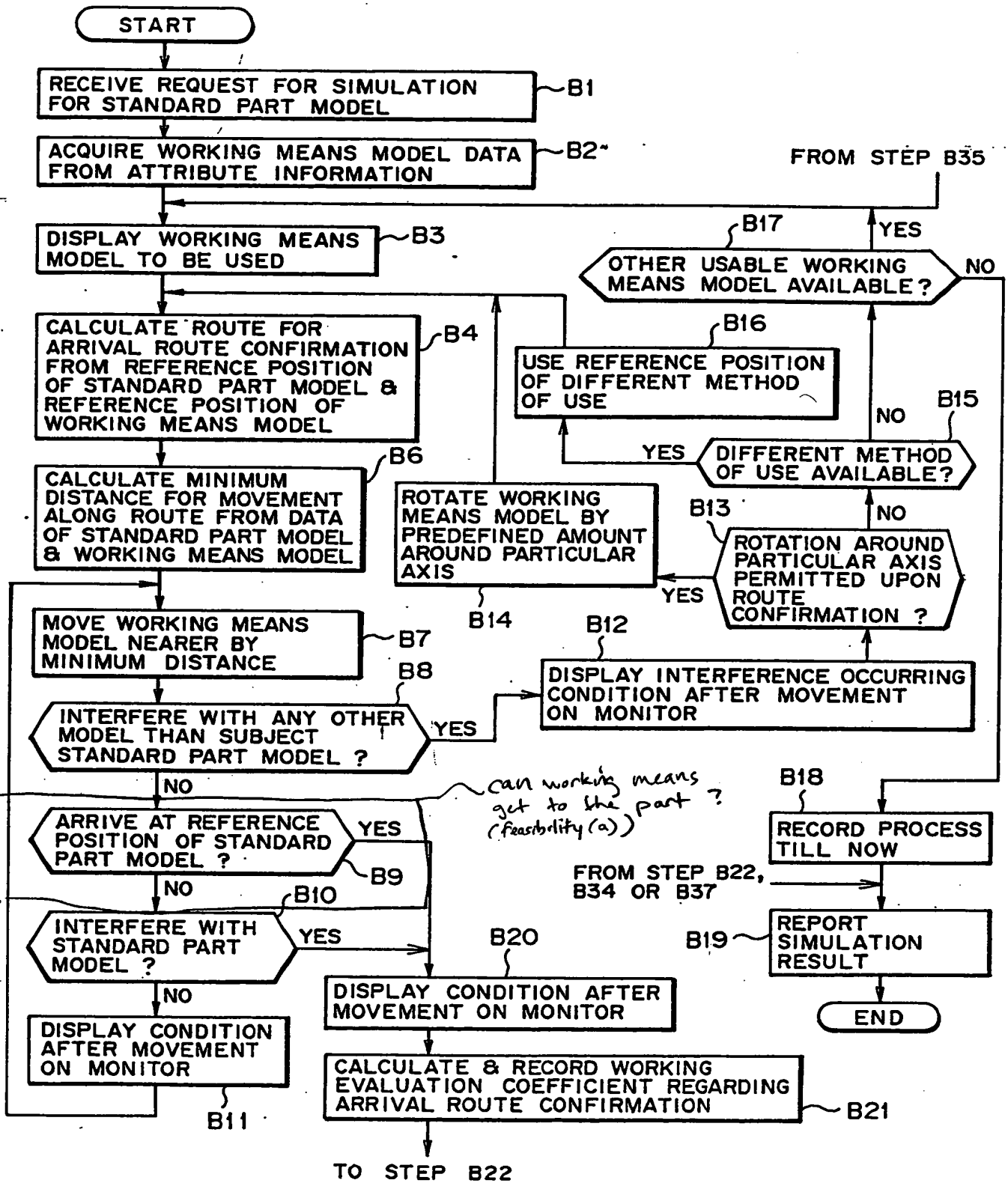

FIG. 12